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MEASURES REQUIRED TO DEVELOP BUILDING MATERIALS PRODUCTION IN THE INFORMAL ECONOMY, INCLUDING RESEARCH AND DEVELOPMENT, INFORMATION, TRAINING AND QUALITY IMPROVEMENT *

prepared by

UNCHS (Habitat)

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SUMMARY

This issue paper examines measures required to develop building materials production in the informal economy within the limitations of existing constraints and in the light of its contributions to national development.

National governments have a role to play in improving the sector by providing a development framework supporting the growth of informal associations, encouraging savings and credit societies, providing basic data to guide development of the sector, and using its role as a client of the building materials industry to influence positive development trends in the sector.

The international community can support efforts of national governments in the areas of technology transfer, improvements in quality control procedures, improvements in basic management and vocational skills and preparation of empirical studies about the sector.

The Consultation is asked to deliberate on:

- Means that national governments can use to provide a framework for development of the sector;
- Areas in which the international community can provide support to efforts of national governments;
- Mechanisms which can make support to the sector most effective.

The points for discussion proposed to the Consultation are included in paragraph 30 of this paper.

I. BACKGROUND

1. In many developing countries, most of the dwellings for the urban and rural population are constructed using such building materials as sun-dried mud blocks, cement blocks, wooden doors and windows, galvanized iron sheets, stoneware, and clay tiles for roofing. For a majority of these materials, the production is usually organized in small-scale plants in a system which can best be termed informal when related to conventional systems of production. This informal system of production, as with several other informal-sector economic activities, has emerged partly as a continuation of age-long traditional activities but also as a modern system of production to provide such elements as cement blocks and timber window frames which the formalized systems of production have not been capable of providing to the satisfaction of the entire construction market.

2. To some extent, small-scale building materials production can hardly be broken down into formal and informal systems, since in both cases the inputs, markets and constraints tend to be similar. Perhaps, the peculiar characteristics of the informal sector lie mostly in the nature of inputs utilized for production (see annex, p.14), such as the meeting of land requirements through squatting or illegal manufacturing in residential premises. Similarly, in place of conventional financial institutions, the informal sector draws on traditional credit systems, such as money lenders or family donations. Training of skilled labour is largely through the apprenticeship system, and sometimes extensive family labour (including children and females) is used, so that this component of hidden costs is reflected in a reduction of final cost of building materials. Most of all, where the production process involves the use of machinery and tools, there is often dependence on locally produced equipment, and, where imported machinery is installed, attempts are made to provide indigenous solutions to the problems of spare parts and maintenance.

3. The informal sector on the whole makes important contributions to national economic development but this level of importance is not evident, because of lack of adequate statistics. For instance, it is estimated that in Kenya the informal construction sector provided 30 per cent of total gross domestic product of construction between 1969 and 1978, while in the Ivory Coast it accounted for 30 per cent of value added by the construction sector. As a component of the informal economy, small-scale building materials production contributes significantly to national development, 1/ notably:

1/ UNCHS (Habitat): Small-scale building materials production in the context of the informal economy. Nairobi, Kenya, 1984. Background paper for the Global Preparatory Meeting of UNIDO-UNCHS Consultation on Building Materials Industry, Vienna, September 1984.

(a) In developing countries, over 70 per cent of the population live in rural dwellings, and a large proportion of the urban population live in low-income shelter, with both groups being highly, if not solely, dependent on building materials and components from the informal sector.

(b) There is positive interaction between informal-sector building materials production and the formal construction sector, demonstrated by the example whereby Portland cement and sawn timber are, in general, manufactured by formal-sector production systems, but the ultimate production of cement blocks and wooden door frames, in small-scale units, remains to some extent an informal-sector activity. Moreover, there are instances where, for lack of any alternative, such informal-sector products are used in public-construction projects as well as private-sector middle-income or high-income residential construction.

(c) Employment and skill generation, as well as multiplier effects in terms of backward and forward linkages to other economic activities, can be derived from the sector to such an extent that these linkages can be an important stimulus to economic growth.

4. Because of certain limitations, the contributions to national development by this system of building materials production have not yet been maximized. For instance, the quality of products is generally not satisfactory, the amount and range of materials and components being produced from the sector is still inadequate when related to the large-scale unfulfilled demand for shelter, and, worst of all, the cost of production in some instances tends to be high, resulting in an unfavourable competitive vis-à-vis import-based alternative materials or making the final selling price unaffordable to a large section of the population. To illustrate the scale of unfulfilled demand for shelter, for which informal sector building materials production could continue to be the main source of materials supply, it is only necessary to consider the developing world's population of 3.3 billion (1980), the majority of whom are in rural areas still living in deplorable shelter conditions. This population will grow by an estimated 1.5 billion between 1980 and 2000, requiring an enormous increase in housing output to accommodate new households and replace unimprovable existing housing. However, an even more challenging task facing developing countries is the need to provide basic shelter, by the end of the century, for a large proportion of this population, in the urban areas, who will be poor and unemployed or underemployed.

5. The two basic problems of poor quality of products and inadequate quantities of desired output are compounded by the fact that the level of importance of or extent of constraints to the sector have not as yet been established, for the purpose of agreeing on the most effective forms of assistance that could be given to the sector. In justifying measures to develop building materials production in the informal sector, a sufficient basis may be the existing level of contribution to social and economic development, but even more important is the fact that potential benefits can be realized on a greatly increased scale. For instance, the system of production adopted by this component of the building materials industry can be developed to supplement the current formal-sector modes of production which often tend to be dependent on scarce and expensive factors of production. Alternatively, items such as lime, pozzolana and gypsum, which are suitable for small-scale informal-sector systems of production, can be promoted so as to reduce the total consumption of cement, bearing in mind the fact that the cement industry is a typical example of production with an energy-consuming pattern unfavourable to many developing countries.

6. The objectives of reducing production cost, improving quality of finished products, increasing supply and diversifying range of materials and components within the informal sector can be met if effective measures are adopted regarding research and development, transfer of technologies, training of manpower, information dissemination and provision of capital and credit. These measures have to be applied while maintaining the peculiar advantages of the informal sector. Intervention in the informal sector with measures for improvement is a highly debatable issue, because there is a likelihood that it will transform or formalize the sector at the expense of the inherent advantages of informal-sector production. On the other hand, it seems possible that certain measures could be applied in a manner which would not necessarily formalize the sector.

7. For instance, measures to ensure availability of primary inputs for production will not necessarily transform the sector, since in most cases both formal-sector and informal-sector small-scale building materials producers tend to purchase inputs such as cement, timber, tools and fuel from the same sources. Similarly, the adoption of on-the-job training methods or apprenticeship training is already an inherent feature of the sector, and quality improvement measures should not have a negative impact on the sector, as long as they are not imposed as a statutory obligations but offered as supportive guidance which may gradually be accepted in response to competitive market forces. One peculiar advantage of the informal sector, which intervention measures

should seek to protect, is that investment decisions and the process of transforming such decisions into real production are not constrained by undue delays and other unfavourable regulatory procedures as exemplified in the formal sector.

8. The issue that this paper addresses is the extent to which, given the importance of small-scale building materials production in the informal economy, the measures outlined below are capable of developing the sector, so as to maximize its contribution to national development.

II. MEASURES TO DEVELOP BUILDING MATERIALS PRODUCTION IN THE INFORMAL ECONOMY

A. Role of National Governments

9. Small-scale building materials production in the context of the informal economy is an activity which has already been established on an extensive scale in most developing countries. Most often, this sector operates with little or no dependence on support from national governments. Even though the sector could probably maintain its current role without any external support, it seems reasonable to suppose that the constraints which limit the maximization of development contributions from the sector could be reduced by providing some form of assistance. In this regard, national governments can play a fundamental role. In order to economize on the few resources that can be provided as external support, governments have an overall responsibility for initiating policies for and guiding development of the sector. In particular, certain support actions will require assistance from the international community, and it is for this reason that national governments have the task of initiating, co-ordinating and ensuring efficient use of scarce resources available through international assistance. Since the sector has a potential for generating skills and high levels of employment as well as the ability to stimulate growth in other sectors, governments could consider their support for the sector as a significant strategy in the context of an overall economic development plan. National governments can provide the framework required to develop the sector by focusing attention on the following measures.

1. The government as a potential client of informal-sector products

10. In the process of providing infrastructure, public amenities and shelter, governments purchase substantial quantities of building materials and, with such purchasing power at their disposal, they can influence development trends in the building materials industry. Construction activities in low-income settlements are almost entirely dependent on building materials from the informal sector, and certain government projects should be able to utilize such products. If government agencies are able to utilize these materials, they can minimize the pressure on alternative building materials which are produced in insufficient quantities in the formal sector. Apart from the fact that indigenous building materials are more appropriate for low-cost construction than imported materials, government agencies can purchase the materials with the secondary motive of supporting improvement in the sector.

11. For instance, government agencies can specify the quality of building materials required for public construction projects, so that an opportunity will be created to promote measures on quality improvement. By providing a market for informal-sector products, governments can also indirectly help to consolidate or even increase productive capacity by stimulating investment in the sector. Again, the task of promoting the wide-scale adoption of certain innovative building materials, such as sisal-cement roofing sheets, can be facilitated if these materials are frequently utilized in government-sponsored construction projects. In this way, the role of the government as a client of the informal sector can serve the purposes of supplying the needs of the public sector, while, at the same time, leading to improvements in informal-sector building materials production for private-sector construction.

12. In general, governments can use their influence as clients of the building materials industry to promote development of small-scale building materials production in the context of the informal economy by:

(a) Establishing favourable conditions in government tender documents for purchase of suitable building materials from the informal sector;

(b) Using public construction projects to promote the wide-scale acceptability of products such as soil-cement blocks, building stones, pozzolana-lime products and other typical products of the informal sector;

(c) Specifying new products to be purchased from selected producers as a means of promoting diversification of products;

(d) Using sources of supply of building materials from the informal sector as channels of communication for dissemination of information on technologies;

(e) Providing incentives in the form of exemptions from taxes, notably sales tax, and payment of subsidized utility rates for specified turnover.

2. Mobilizing savings for provision of capital goods and credit

13. Lack of credit for working capital and for purchases of basic capital goods has been a hindrance to the development of the sector. Especially in the informal sector, where the production process tends to be intermittent owing to frequent shortages of critical inputs and irregular demand patterns, there is a need for working capital to maintain, at least, the core of the production team for periods between production cycles and, also, to hold minimal stocks of inputs which are subject to frequent shortages. This problem persists despite the fact that

there are financial resources within the informal economy which as yet have not been mobilized as savings or revolving funds for investment and re-investment. Central governments may not be able to use the limited funds available to them for providing loans to the informal sector, and conventional financial institutions are not designed to meet such needs, so that savings generated within the sector could be a possible source of capital funding. The governments' role in mobilizing savings need not necessarily involve direct participation but could consist of a promotional strategy, utilizing traditional systems for collection of savings and granting of loans.

14. In this regard, governments can help mobilize savings within the sector and support the establishment or strengthening of appropriate credit and savings societies by:

(a) Recognizing existing traditional savings societies or other informal credit and savings societies, or encouraging the growth of such activities, by providing institutional or administrative support to credit and savings societies which are geared to the interests of small-scale producers in the informal economy;

(b) Contributing to seed capital and providing financial support to differential interest rates as incentives to credit and savings societies;

(c) Providing facilities to enable credit and savings societies to import basic tools and equipment which are indispensable to production;

(d) Promoting or establishing local organizations to lease a variety of equipment and tools for small-scale building materials production.

(e) Promoting local organizations to stock building materials and provide them to actual users against loans provided by savings societies.

3. Support for informal organizations or associations

15. Measures aimed at improving the skills of informal-sector manufacturers or disseminating information on appropriate technologies and quality-control procedures can be facilitated with the co-operation of informal associations. The relevance of such associations is that activities in the sector are usually scattered with many operators involved, and it will be almost impossible to make contact individually with all of them. However, through informal groupings, it should be possible to intervene in the sector, since they could be used as channels of communication or agents of change. Another advantage of this system is that it could stimulate operators in the informal sector to undertake their own development programmes through self-help methods. In some countries, these groupings are already in existence for particular products, but, in others, efforts will have to be made at encouraging their growth.

16. In both cases, governments can play a role in promoting the development of informal associations by:

(a) Using existing associations as mechanisms for providing training, demonstrating new technologies, providing capital goods and disseminating information;

(b) Providing incentives such as participation in government-sponsored workshops and construction projects;

(c) Using leaders of informal groupings to participate in government-supported programmes within the sector, notably, mobilizing savings, monitoring the use of credit and ensuring proper maintenance of communal equipment;

(d) Disseminating information on benefits of forming informal associations so as to encourage the growth of new groupings.

4. Basic data for development of the sector

17. To some extent, the lack of data about the contributions and limitations of the sector has made it difficult for appropriate measures to be applied for improving the sector. The data required covers basic characteristics of a range of production functions. In particular, it should be possible to identify, at the national level, the types of building materials and components that deserve priority attention, either as items already being produced or products yet to be promoted. Information is also required on informal-sector building materials in terms of the inputs that are locally available or can be promoted locally and components which have to be imported.

18. National governments can help to meet this need by:

(a) Providing such data or providing support to institutions which are capable of compiling such a data base;

(b) Incorporating data-compilation on the subject as a special component of regional or national census programmes.

B. Support from the international community

19. The level of importance of small-scale building materials production in the context of the informal economy has already been emphasized. However, owing to certain constraints, the contributions of the sector to national development can only be maximized if assistance is offered. National governments, to a large extent, can provide this vital assistance, but in a majority of cases some of the resources required are beyond the capabilities of developing countries and must come from the international community. Some of the supportive inputs required from the international community, notably the transfer of appropriate technologies, do not require new inventions but rather effective ways of transferring and applying existing know-how.

20. There are at least four basic areas in which national governments can be supported by the international community: (a) transfer and development of appropriate technologies for production and utilization of informal sector building materials; (b) promotion of quality-improvement procedures notably testing and standards; (c) programmes on improvement of basic management and vocational skills; and (d) empirical studies regarding building materials production in the informal sector. In all of these areas, one essential requirement is to adopt innovative mechanisms for information dissemination, using audio-visual material, illustrated manuals and other forms of graphic communication that can be used by extension services. The underlying reason for this approach is that a majority of those operating in the informal sector have a low level of literacy and will not be reached by conventional methods of teaching a subject as complex as building materials production.

21. Some of the problems which confront the sector are so simple that they require no resource input other than well-disseminated information on improved methods of production. For instance, largely as a consequence of ignorance, some concrete block or clay brick manufacturers adopt production processes, such as drying of green bricks in hot sunlight or adding extra qualities or water to sisal-cement mix in order to increase fluidity of the mix, which are directly in conflict with basic principles of quality control. These faulty practices can easily be corrected, without providing new equipment or tools or additional vocational training, by simply introducing effective dissemination of information to the target group. Apart from using effective systems of information dissemination as a tool to provide support in the required areas, there are other types of action that the international community can take, depending on the area of support.

1. Transfer and development of appropriate technologies

22. If appropriate technologies are applied in the sector, the problem of low quality of products can be reduced. For instance, quality control in production of fibre-cement roofing tiles can be improved with the use of improved machinery or tools, such as a vibrator which, in the case of fibre-cement roofing sheets, is used to regulate thickness of the final product. The use of appropriate technologies can also reduce production costs, as scarce inputs such as cement and fuel can be effectively utilized, reducing the level of wastage in current production practices. Similarly, significant increases in output as well as diversification of products can be achieved by applying appropriate technologies. One reason for the gap between proven technologies and those which are popularly used in the informal sector is that effective procedures for technology transfer are yet to be adopted.

23. The international community can assist in meeting this objective by:

(a) Assisting in demonstration projects as a basis for introducing improved technologies to groups of producers;

(b) Assisting in the establishment of local technology-adaptation centres as focal points for networks of technology exchange between developing countries;

(c) Providing technical assistance to support local production of capital goods.

2. Promoting quality improvement procedures

24. The relatively low quality of products from the informal sector is partly due to the fact that as yet there are no standards and specifications to guide the production of materials such as stabilized earth blocks, lime, pozzolana, sisal-cement roofing sheets, welded steel windows and doors, and some timber products. In instances where quality control procedures are in existence, there are hardly any effective means of ensuring that the correct procedures are adopted in the informal sector. In addition to these constraints, building codes and regulations in most developing countries tend to ignore the materials and components which are predominantly produced by the informal sector, so it is likely that, when appropriate codes and regulations are applied, a wide market for such products will be sustained, thus indirectly stimulating adherence to procedures for quality improvement in the production process. Effective quality improvement procedures, if popularly adopted in the sector, can lead to benefits, such as increased durability and safety of products, reduction in production costs, prospects for expanded marketing of products and, above all, eventual standardization of products. However, it is important to ensure that any effort in promoting quality improvement in the sector does not lead to a noticeable increase in the cost of the final products.

25. The international community can support national governments in this area, by:

(a) Undertaking joint research projects to formulate standards and specifications for the production and utilization of materials produced in the informal sector, such as soil blocks, lime, pozzolana, roofing materials such as fibre-cement roofing and timber components;

(b) Providing technical assistance or guidelines on adoption of building codes and regulations, so as to enhance the utilization and production of materials and components from the informal sector;

(c) Supporting demonstration projects for on-the-job training of selected master craftsmen and apprentices on testing and other quality-control procedures, with a view to achieving their wide-scale adoption.

3. Programmes to improve basic management and vocational skills

26. With adequate skills in basic management, producers in the informal sector can minimize the constraints posed by occasional short-ages of critical inputs, such as cement for concrete blocks and fuel either for production or distribution of finished products. The lack of such management skills can mean that critical inputs required for production are procured without any meaningful planning, thereby creating a bottleneck in the entire production process which may lead to high production costs. The concept of substituting one resource input for another in times of scarcity or improving productivity of labour through the concept of labour-capital substitutability can only be of use if the entrepreneur is equipped with certain vital management skills. Effective investment decisions to expand production lines, diversify products or adopt new strategies for marketing of products all depend on basic management training being offered to informal-sector producers. The apprenticeship training system, as a deep-rooted process of skill acquisition in the informal sector, has several advantages which can be developed to meet increasing requirements, because conventional management and vocational training techniques may not be suitable to the sector.

27. Support from the international community can be given in the following manner:

(a) Undertaking the preparation of illustrated manuals on basic management principles and other vocational skills, to be used in running of on-the-job training programmes for selected projects;

(b) Providing information on methodological tools to selected vocational institutions which are specifically oriented to providing on-the-job training to small-scale enterprises;

(c) Undertaking joint programmes in terms of seminars or workshops for information exchange involving decision-makers and local programme co-ordinators concerned with policy and programme implementation for small-scale enterprises.

4. Further empirical studies: Support for further empirical studies on small-scale building materials production in the context of the informal economy

28. To the extent that empirical evidence about the characteristics and contributions of the sector is still limited, the types of measures which will have the most impact

on the growth of the sector will remain questionable. By clarifying some actual indicators about the sector through empirical studies, it may be possible to establish the best possible ways of improving the sector using minimal resources and effort. For instance, it will be necessary to establish those measures which are likely to retain the advantages of low costs of production in the informal sector but simultaneously are capable of leading to over-all growth or expansion of the sector.

29. Assistance from the international community in empirical studies can take several forms, including:

(a) Undertaking studies at national or sub-national level on aspects related to quantification of characteristics and contributions of informal-sector building materials production to other sectors of the national economy;

(b) Providing methodological tools to local agencies for empirical research on selected aspects of the sector;

(c) Providing technical assistance in the form of research grants for specific studies and undertaking dissemination of findings of the studies;

(d) Assisting in promoting information exchange based on experiences of developing countries to local agencies and research units;

(e) Assisting in organizing seminars and symposia on approaches to and findings of empirical studies on the sector.

POINTS FOR DISCUSSION

30. Participants are invited to devote special attention to the following points:

(a) How could national governments provide a framework for maximizing the contributions of small-scale building materials production in the informal economy, incorporating external support or assistance in the most efficient manner?

(b) In order to complement efforts of national governments to realize significant improvements in building materials production in the informal economy, can the international community provide support in:

(i) Development and transfer of appropriate technologies, bearing in mind the existence of proven local or foreign technologies?

(ii) Facilities or procedures for quality improvement, in view of the constraints posed by lack of standards and specifications?

(iii) Improvement in management and vocational skills, especially the role that basic management principles can play overcoming the problems of low rates of re-investment, capital accumulation and efficient mix of resource inputs?

(iv) Information flow, with particular interest in the low level of literacy and deep-rooted socio-cultural values vis-à-vis the technical nature of building materials production?

(v) Empirical studies, with the aim of providing for realistic improvement measures in the sector, focusing on a quantitative assessment of areas, such as contributions to employment generation and linkages with other sectors of the economy?

(c) Considering the fact that any significant improvement in informal sector building materials production will benefit the rural and urban majority, in terms of shelter provision and employment generation, but realizing the limitations of resources currently facing the international community, which items should constitute priority areas for assistance and, more important in which manner should assistance be carried out so as to have the greatest impact?

Annex:* Comparison of labour intensity, capital intensity and machinery and tools used per worker etc. in building materials production in Sri Lanka (1973 values)

Sector [a]	No. of establishment	Average output per establishment Rs.	Employment (direct) in Rs. 1m production [b] No.of persons	Payment to labour (direct) in output [b]	Gross capital assets per worker [c] m.v. Rs.	Machinery and tools per worker m.v. Rs.	Capital output ratio m.v.
Traditional	100	below 50,000	410 [d]	36	400-2,000	1-700	0.3-0.8
Small-scale including traditional	169	below 300,000	130 [d]	21	400-12,000	1-7700	0.3-1.9
Modern medium-scale	28	300,000 1,000,000	40	10	6,400-44,000	2,500-24,000	0.4-1.6
Modern industrial	12	above 1,000,000	37	17	9,800-217,000	3,300-182,000	0.2-4.3

m.v. - market value of assets.

a/ Principal materials in the different sectors are given below. Some materials are manufactured in more than one sector. Traditional: Bricks, country tiles, sand, lime, cadjan, etc. Small scale: Timber, cement products, brassware, aggregate, drainage fittings, electrical fittings, sanitary ware, etc. Modern medium-scale: Flat tiles, paint, varnish and distemper, wire nails, electrical fittings and switches, brassware and other fitting, etc. Modern industrial: Cement, steel, plywood products, asbestos cement products, hardware, ceramics, plastic pipes, electrical cables, etc.

b/ At ex-factory price.

c/ Working capital was not included.

d/ A part of this employment is part-time or seasonal. No allowance has been made for this in the computations in this table.

Source: Ganesan (1979), op. cit., p.25.

* Annex: reproduced from Ganesan (1982).

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Issue No.2:	Measures to strengthen indigenous technological capabilities in the production of building materials	ID/WG.434/3
Issue No.3:	Measures required to develop building materials production in the informal economy, including research and development, information, training and quality improvement	ID/WG.434/4

Background papers

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Measures and actions to increase the production of indigenous building materials in the context of enhanced import substitution	ID/WG.425/3
Outline of a policy for mastery and selection of technology in relation to capital goods for cement, brick and plaster manufacturing - International co-operation in these industries	ID/WG.425/4/Rev.1
The building materials industry in developing countries: Analytical appraisal (Sectoral Studies Series No.16, Volume I) *	UNIDO/IS.512

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Information papers

Report (of the Global Preparatory Meeting for the First Consultation on the Building Materials Industry)	ID/WG.425/7 + Corr.1
Promoting the use of wood in construction	ID/WG.395/2

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RESEARCH PRIORITIES FOR THE BUILDING MATERIALS INDUSTRIES IN DEVELOPING COUNTRIES**

by

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***Secretary General, International Council for Building Research Studies and Documentation (CIB), Rotterdam, Netherlands.

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OUTLINE OF A POLICY FOR MASTERY AND SELECTION OF TECHNOLOGY IN RELATION TO CAPITAL GOODS FOR CEMENT, BRICK AND PLASTER MANUFACTURING - INTERNATIONAL CO-OPERATION IN THESE INDUSTRIES**

by

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